FACT SHEET

as required by LAC 33:IX.2411, for draft **Louisiana Pollutant Discharge Elimination System Permit No. LA0032131; AI 43356; PER20040001** to discharge to waters of the **State of Louisiana** as per LAC 33:IX.2311.

The **permitting authority** for the Louisiana Pollutant Discharge Elimination System (LPDES) is:

Louisiana Department of Environmental Quality
Office of Environmental Services
P. O. Box 4313
Baton Rouge, Louisiana 70821-4313

I. **THE APPLICANT IS:** St. Charles Parish Council
Luling Wetland Wastewater Assimilation Project
P.O. Box 302
Hahnville, LA 70057

II. **PREPARED BY:** Christopher K. Bertrand

DATE PREPARED: July 19, 2007

III. **PERMIT ACTION:** revoke and reissue* LPDES permit LA0032131, AI 43356

LPDES application received: November 16, 2004

LPDES permit effective date: October 1, 2004
LPDES expiration date: September 30, 2009

* The permit is being revoked and reissued at this time to make provisions for discharge to the Luling wetland. The facility is currently operating under Administrative Order CWA-06-2006-1822 to discharge into the wetland wastewater management area.

IV. **FACILITY INFORMATION:**

A. The application is for the discharge of treated sanitary wastewater to the Luling Wetland from a publicly owned treatment works serving the communities of Luling, Boutte, Willowdale, Willow Ridge, Mimosa, Lakewood, and Davis Plantation.

B. The permit application does not indicate the receipt of industrial wastewater.

C. The facility is located at 199 Texaco Road in Luling, St. Charles Parish.

D. The treatment facility consists of a four cell oxidation pond. Cells 1 and 2 are aerated, and Cells 3 and 4 are open. The effluent flows to a wet well where it is pumped to a sand filter, then to the chlorine contact chamber. Following dechlorination the effluent is discharged to the wetland.

E. **Outfall 001** sampling point for the treated discharge after the last treatment unit and before distribution to the Luling Wetland. This is located on the north side of side of the George Cousins Canal.

Location: Latitude 29° 52' 43" North
Longitude 90° 21' 33" West

Description: treated sanitary wastewater

Design Capacity: 3.2 MGD

Type of Flow Measurement, which the facility is currently using:

Flow Meter with Continuous Recorder

The 6 distribution points for Outfall 001. The hydrology of the Luling Wetland is dominated by overland, sheet flow hydrology. There is exchange on the southern boundary of the site with the Louisiana Cypress Lumber Canal, but this has little impact on the northern part of the site where effluent will enter the wetland.

Distribution Point 001A: Located east of the northeast corner of the oxidation pond.

Discharge Location: Latitude 29° 52' 58" North
Longitude 90° 21' 30" West

Distribution Point 001B: Located due east of Distribution Point 001A.

Discharge Location: Latitude 29° 52' 58" North
Longitude 90° 20' 39" West

Distribution Point 001C: Located southeast of Distribution Point 001B.

Discharge Location: Latitude 29° 51' 43" North
Longitude 90° 18' 47" West

Distribution Point 001D: Located west of Distribution Point 001C.

Discharge Location: Latitude 29° 51' 42" North
Longitude 90° 19' 51" West

Distribution Point 001E: Located northwest of Distribution Point 001D.

Discharge Location: Latitude 29° 52' 41" North
Longitude 90° 20' 51" West

Distribution Point 001F: Located due west of Distribution Point 001E and due south of Distribution Point 001A.

Discharge Location: Latitude 29° 52' 41" North
Longitude 91° 21' 30" West

V. RECEIVING WATERS:

The discharge is by dispersal directly into the Luling Wetland in segment 020303-001 of the Barataria Basin. Luling Wetland—Forested wetland located 1.8 miles south of U.S. Hwy. 90 at Luling, east of the Luling wastewater treatment pond, bordered by George Cousins Canal to the west and Louisiana Cypress Lumber Canal to the south.

The designated uses of segment 020303-001 are as indicated in LAC 33:IX.1123.C.3:

Secondary Contact Recreation
Fish and Wildlife Propagation

Since the Luling Wetland is naturally dystrophic (see LAC 33:IX.1123.C.3 segment 020303-001), it will significantly benefit from the effluent. The Louisiana Cypress Lumber Canal is the first perennial waterbody into which the Luling Wetland flows. Therefore, a water quality screen was conducted to determine the potential for toxicity from chemical specific pollutants to the Louisiana Cypress Lumber Canal. The flow of the Louisiana Cypress Lumber Canal is tidally influenced.

The **critical tidal flow** (7Q10) of the Louisiana Cypress Lumber Canal is 1.2 cfs.

The **hardness value** is 22 mg/l and the **fifteenth percentile value for TSS** is 153.1 mg/l.

VI. ENDANGERED SPECIES:

The receiving waterbody, Subsegment 020303-001 of the Barataria Basin, is not listed in Section II.2 of the Implementation Strategy as requiring consultation with the U. S. Fish and Wildlife Service (FWS). This strategy was submitted with a letter dated September 29, 2006 from Watson (FWS) to Brown (LDEQ). Therefore, in accordance with the Memorandum of Understanding between the LDEQ and the FWS, no further informal (Section 7, Endangered Species Act) consultation is required. It was determined that the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat.

VII. HISTORIC SITES:

The discharge is from an existing facility location, however the State Historic Preservation Officer was contacted due to the expansion of the facility into the Luling Wetland. There are no known historical structures or archeological sites in the area, according to a response letter from the State Historic Preservation Officer dated August 4, 2003.

VIII. PUBLIC NOTICE:

Upon publication of the public notice, a public comment period shall begin on the date of publication and last for at least 30 days thereafter. During this period, any interested persons may submit written comments on the draft permit and may request a public hearing to clarify issues involved in the permit decision at this Office's address on the first page of the fact sheet. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

For additional information, contact:

Ronnie Bean
Water Permits Division
Department of Environmental Quality
Office of Environmental Services
P. O. Box 4313
Baton Rouge, Louisiana 70821-4313

IX. PROPOSED PERMIT CONDITIONS:

Discharge is to the Luling Wetland – Subsegment 020302-001 for which a UAA has been completed and to which no TMDLs apply. However, the Luling Oxidation Pond previously discharged to the George Cousins Canal in Subsegment 020302 – Lake Cataouatche and Tributaries for which TMDLs have been completed. Due to the fact that the Luling Oxidation Pond no longer discharges to Subsegment 020302, the TMDLs may need to be revised.

Final Effluent Limits:

OUTFALL 001

DESIGN CAPACITY is 3.2 MGD

Systems that discharge to wetlands are given secondary limits. LAC 33:IX.711.D.2.c, states that existing major facilities with treatment equivalent to Secondary Treatment, such as an oxidation pond system are given 30 mg/l BOD_5 and 90 mg/l TSS (30-day average) levels of treatment. The secondarily treated wastewater discharged into the natural wetlands provides for the introduction of nutrient rich wastewater and sediments. Both are beneficial to the wetlands in that they stimulate productivity, in the form of increased vegetative growth, and also counter the subsidence rate of the wetland. Additionally, wetlands are known to assimilate the nutrient levels present in secondarily treated wastewater to their advantage.

The Luling Wetland is a forested wetland with permanent inundation. The vegetation is predominantly bald cypress and water tupelo with a small amount of red maple. The major landowner of the Luling Wetland is Rathborne Land Company. The wastewater assimilation area (Area A as delineated in the Luling Wetland UAA) has an area of 1041 acres.

There are six Distribution Points (001A – 001F) that will distribute effluent to the wetlands. The Distribution Points will be employed in any combination and rotation necessary to ensure uniform coverage and to maximize the assimilation potential and productivity of the wetland. Dates of employment of the individual Distribution Points will be noted in the Annual Wetland Monitoring Report.

Final limits shall **BEGIN** the effective date of the permit, and **EXPIRE** on the expiration date of the permit.

Effluent Characteristic	**Monthly Avg.(lbs/day)**	**Monthly Avg.**	**Weekly Avg.**	**Basis**
BOD_5	801	30 mg/l	45 mg/l	Limits are based on secondary treatment for sanitary wastewater in accordance with LAC33:IX.711D.2.b.
TSS	2402	90 mg/l	125 mg/l	Limits are based on secondary treatment for sanitary wastewater in accordance with LAC33:IX.711D.2.b.
Total Nitrogen	report	report mg/l	report mg/l	Values obtained will be used to calculate long term wetland loading rates.*
Total Phosphorus	report	report mg/l	report mg/l	Values obtained will be used to calculate long term wetland loading rates.*

*** If loading rates exceed 15 g/m^2/yr total nitrogen or 4 g/m^2/yr total phosphorus, then either the loading rates must be reduced or the assimilation area must be increased.**

Heavy metals and other toxins found in wastewater can have damaging effects on wetland systems. Research has found that the movement of heavy metals in the natural cycle of the wetland vegetation and sediments implies that wetlands are not final sinks for these metals. As a result, effluents with high metals concentrations such as would be introduced by industrial waste **should not** be applied to wetland systems. Due to the potential long-term, detrimental impacts from heavy metals, salts, biocides, and other toxins, wetland discharges will be limited primarily to domestic effluent.

Other Effluent Limitations:

1) Fecal Coliform

The discharge from this facility is into a water body (wetland), which has a designated use of Secondary Contact Recreation. However, Primary Contact Recreation limits of 200/100 ml (Monthly Average) and 400/100 ml (Weekly Average) are proposed as Fecal Coliform limits in the permit. These limits are being proposed through Best Professional Judgment as an added measure for public safety, and due to the fact that existing facilities have demonstrated an ability to comply with these limitations using present available technology.

2) pH

According to LAC 33:IX.3705.A.1., POTW's must treat to at least secondary levels. Therefore, in accordance with LAC 33:IX.5905.C, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units at any time. (Limits as established through BPJ considering BCT for similar waste streams in accordance with LAC 33:IX.5905.C.)

3) **Solids and Foam**

There shall be no discharge of floating solids or visible foam in other than trace amounts in accordance with LAC 33:IX.1113.B.7.

4) **Residual Chlorine (TRC)**

After disinfection and prior to final distribution to the wetland, the effluent shall contain NO MEASURABLE Total Residual Chlorine at any one time monitored by grab sample. Given the current constraints pertaining to chlorine analytical methods, NO MEASURABLE will be defined as less than 0.1 mg/l of chlorine.

Toxicity Characteristics

In accordance with EPA's Region 6 Post-Third Round Toxics Strategy, permits issued to treatment works treating domestic wastewater with a flow (design or expected) greater than or equal to 1 MGD shall require biomonitoring at some frequency for the life of the permit or where available data show reasonable potential to cause lethality, the permit shall require a whole effluent toxicity (WET) limit (*Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards*, September 27, 2001 VERSION 4).

Whole effluent biomonitoring is the most direct measure of potential toxicity which incorporates the effects of synergism of the effluent components and receiving stream water quality characteristics. Biomonitoring of the effluent is, therefore, required as a condition of this permit to assess potential toxicity. LAC 33:IX.1121.B.3. provides for the use of biomonitoring to monitor the effluent for protection of State waters. The biomonitoring procedures stipulated as a condition of this permit are as follows:

The permittee shall submit the results of any biomonitoring testings performed in accordance with the LPDES Permit No. LA0032131, **Biomonitoring Section** for the organisms indicated below.

TOXICITY TESTS	FREQUENCY
48 Hour Definitive Toxicity Test using Daphnia pulex	2/year
48 Hour Definitive Toxicity Test using fathead minnow (Pimephales promelas)	2/year

Dilution Series - The permit requires five (5) dilutions in addition to the control (0% effluent) to be used in the toxicity tests. These additional concentrations shall be 32%, 42%, 56%, 75%, and 100%. The low-flow effluent concentration (critical low-flow dilution) is defined as 100% effluent. Results of all dilutions shall be documented in a full report according to the test method publication mentioned in the **Biomonitoring Section** under Whole Effluent Toxicity. This full report shall be submitted to the Office of Environmental Compliance as contained in the Reporting Paragraph located in the **Biomonitoring Section** of the permit.

The permit may be reopened to require effluent limits, additional testing, and/or other appropriate actions to address toxicity if biomonitoring data show actual or potential ambient toxicity to be the result of the permittee's discharge to the receiving stream or water body. Modification or revocation of the permit is subject to the provisions of LAC 33:IX.2383. Accelerated or intensified toxicity testing may be required in accordance with Section 308 of the Clean Water Act.

Wetland System Monitoring

The five (5) year LPDES permit contains technology-based effluent limitations for BOD_5, TSS, and pH reflecting the best controls available. Additional water quality-based effluent limitations and/or conditions are included in the LPDES permits. State narrative and numerical water quality standards are used in conjunction with EPA criteria and other available toxicity information to determine the adequacy of technology-based permit limits and the need for additional water quality-based controls.

The state has established a narrative water quality criterion, which states that:

"No substances shall be present in the waters of the state or the sediments underlying said waters in quantities that alone or in combination will be toxic to human, plant, or animal life or significantly increase health risks due to exposure to the substances or consumption of contaminated fish or other aquatic life." (*Louisiana Surface Water Quality Standards*, LAC Title 33, Part IX, Chapter 11, Section 1113.B.5.)

However, the State of Louisiana has set the following specific criteria for protection of the receiving Natural Wetlands (the Luling Wetland):

- **NO MORE THAN A 20% DECREASE IN NATURALLY OCCURRING LITTER FALL OR STEM GROWTH;**
- **NO SIGNIFICANT DECREASE IN THE DOMINANCE INDEX OR STEM DENSITY OF BALD CYPRESS**

EPA document *Biological Criteria: National Program Guidance for Surface Waters*, discusses the Clean Water Act and states that "the general authority for biological criteria comes from Section 101(a) of the Act which establishes as the objective of the Act the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters, including natural wetlands. To meet this objective, water quality criteria must include criteria to protect biological integrity. Section 101(a)(2) includes the interim water quality goal for the protection and propagation of fish, shellfish, and wildlife." Biological integrity is functionally defined in this EPA manual as "the condition of the aquatic community inhabiting the unimpaired waterbodies of a specified habitat as measured by community structure and function." The importance and function of wetlands include, but are not limited to the following: erosion and flood control, saltwater intrusion control, water quality enhancement, habitat for threatened and endangered species, wildlife habitat, nutrient material cycling, recreation and aesthetics.

Natural wetland loss is a problem in Louisiana. This problem is caused by insufficient sedimentation and relative sea level rise each year. The introduction of nutrient rich wastewater to natural wetlands is beneficial in that it stimulates productivity in the wetland. This productivity promotes vertical accretion through increased organic matter deposition and the formation of soil through increased root growth. This vertical accretion helps maintain the wetlands, despite the rising water levels. Additionally, the total suspended solids, provided by the wastewater, also increase the sediment level in the wetland.
Although the introduction of wastewater into natural wetlands renders benefits to the wetland system, changes to the system will occur. Therefore, it is important to address issues, which will indicate the extent of these changes and to determine if the changes are acceptable.

In addition to the standard biomonitoring which is proposed in this permit, the biological monitoring schedule proposed below is broader in scope, and more specific to the wetland ecosystem, than standard biomonitoring. It will provide a more direct indication of change in functions of the wetland system as a whole. The proposed biological monitoring schedule for the Luling Wetland Wastewater Assimilation Project is based on BPJ, taking into account the size and characteristics of the wetland system.

The following parameters are proposed to be sampled and monitored for the specified wetland component at all three (3) montoring sites within the wastewater assimilation area and the two (2) monitoring sites within the control area:

- **Sampling and classifying the flora** present and determining percentage of total cover for each vegetative species. The sampling will provide information on whether dominance and species diversity of the community is being altered.
- **Growth studies of vegetative productivity**, which will provide an indication of health and vigor of the plant community.
- **Water stage** is a gauged measurement of the water depth, which will assist in determining stress in the wetlands from hydrologic loadings and will determine the existence of a zone of influence resulting from wastewater applications. The zone around the discharge serves to assimilate the wastewater most effectively. This zone grows larger as wastewater continues to be discharged and the assimilative capacity of the immediate area becomes saturated.
- **Metals and nutrient data from plant tissue samples**, which will identify excesses or deficiencies that could become problematic.
- **Sediment analysis for metals, and nutrients**, which will indicate whether or not metals are bound and buried in the sediments, and nutrients assimilated.
- **Corresponding analysis of surface water** must be made to provide a comparison of water quality in the vicinity of the discharge and at increasing distance from it.

Compared to data from the baseline study, the effects of the discharge on the biological integrity (as defined above) may be accurately assessed.

BASIS FOR ESTIMATE OF WETLAND PLANT PRODUCTIVITY

To measure tree production, three plots were established within the discharge area. Also, two control plots were established in the control area. Within each plot, all trees with a diameter at breast height (dbh) greater than 10 cm were marked with an aluminum identification tag and the species recorded. Tree productivity (total above ground) will be determined from measurements of litter fall and dbh measurements. Litter fall will be collected from established litter boxes, separated into leaf and woody material, dried at 60° C and weighted. Monthly litter fall will be summed for each box to obtain annual leaf litter fall. Tree biomass will be estimated using dbh vs. tree biomass allometric equations calculated for each species in similar forests in the southeastern U.S. Changes in biomass from year to year represent annual wood production. These values for annual litter fall and stem growth can be summed to give annual above ground productivity.

The wetland monitoring procedures stipulated as a condition of this permit are as follows:
The permittee shall submit the results of any wetland monitoring testing performed in accordance with the LPDES Permit Number LA0032131, Part II, Section D, shown in the table below:

PARAMETER	WETLAND COMPONENT			
	FLORA	SEDIMENT	SURFACE WATER	EFFLUENT
Species Classification	P			
Percentage of Whole Cover (for each species)	P			
Growth Studies	A_1			
Water Stage			M	
Metals: Mg, Pb, Cd, Cr, Cu, Zn, Fe, Ni, Ag, Se	P_1	P_1	P	S
Metals Analysis: Hg, As		P_1		
Nutrient Analysis I: TKN, TP	P_1	P_1	S	
Nutrient Analysis II: NH_3N, NO_2N, NO_3N, PO_4		P_1	S	
Others: BOD_5, TSS, pH, Dissolved Oxygen			P	
Accretion Rate		P		

Water quality will be monitored by taking water samples along the path of flow of the effluent in the assimilation site and from one or more control sites.

Sampling in the **WASTEWATER ASSIMILATION AREA** must be conducted as follows:

Collection of a minimum of three samples per site in each of three sites: 1) approximately 100' from the discharge point, 2) midway, and 3) at the point of entrance into the Louisiana Cypress Lumber Canal.

Sampling for the **CONTROL AREA** must be conducted as follows:

Collection of a minimum of three samples per site in the two sites. All three samples will be taken from a site or sites similar to the wastewater management area, but not directly interconnected to the wastewater management area.

A: **ANNUALLY.** Sample once per year at all three (3) WASTEWATER ASSIMILATION AREA sites and the two (2) CONTROL AREA sites and included in the yearly report.

A_1 – Stem growth and litter fall

M: **MONTHLY.** Samples should be taken at all three (3) WASTEWATER ASSIMILATION AREA sites and two (2) CONTROL AREA sites each month and included in the yearly report.

P: **PERIODICALLY.** Sampling must be made once during March through May, and once during September through November in the fourth year of the permit period for all three (3) WASTEWATER ASSIMILATION AREA sites and the two (2) CONTROL AREA sites.

P_1- Sample preservation, handling, and analysis must meet the specifications of the Test Methods for Evaluating Solid Waste Physical/Chemical Methods, third edition (EPA Publication Number SW-846, 1986, or most recent revision) or an equivalent substitute as approved by the administrative authority.

S: **SEMI-ANNUALLY.** Sample twice per year: once during September through February, and once during March through August (sampling events must be a minimum of 4 months apart) for all three (3) WASTEWATER ASSIMILATION AREA sites and the two (2) CONTROL AREA sites and included in the yearly report.

Sampling procedures to be used during the wetland monitoring phase. (*The Use of Louisiana Swamp Forests for Application of Treated Municipal Wastewater: Standard Operating Procedures for Monitoring the Effects of Effluent Discharge.* John W. Day, Jr., Joel Lindsey, Jason N. Day, and Robert R. Lane, Comite Resources, Inc. Used with the permission of Dr. John W. Day, Jr., March 14, 2003)

WATER QUALITY

1. **Dissolved oxygen and water temperature:** is measured using a Yellow Springs Instrument Co. meter or an ORION Model 820 Dissolved Oxygen meter or equivalent. The probe will be calibrated within four hours of use with a known standard (100% air saturation).

2. **pH & TDS:** Measurements of pH and TDS (Total Dissolved Solids) are made in the field using a Corning Checkmate M90 Field System or equivalent. Water samples will be collected in 500 ml polyethylene bottles and returned to the laboratory where pH will again be measured in the lab using a Jenco Markson pH meter, Model 6100 or equivalent.

3. **Nutrients:** Discrete water samples will be taken 5 to 10 cm below the water surface with effort taken not to stir bottom sediments or include any film that may be present on water surface. Samples are collected in 500 ml acid washed polyethylene bottles. The samples will be immediately stored at $4^{B}C$, on ice, for preservation. The samples will be transported to an analytical laboratory, and within 24 hours filtered and sub-sampled. Samples analyzed for NO_2 + NO_3, NH_4 and PO_4 will be filtered in the laboratory using 0.45 um Whatman GF/F glass fiber filters or equivalent, and unfiltered samples will be sub-sampled into 125 mL bottles. Both filtered and unfiltered samples will be frozen until analysis. The samples will be analyzed for nitrite + nitrate ($NO2+NO_3$-N), ammonium (NH_4-N), total nitrogen (TN), total phosphorus (TP), and phosphate (PO_4-P) by an EPA and DEQ approved analytical laboratory using Standard Methods.

4. **Total Suspended Solids:** TSS will be determined by filtering 100-200 mL of sample water through re-rinsed, dried and weighed 47 mm 0.45 um Whatman GF/F glass fiber filters. Filters will then be dried for 1 hr at 105^{B} C, weighted, dried for another 15 minutes, and reweighed for quality assurance (Standard Methods 1992).

5. **Biological Oxygen Demand:** BOD samples will be collected in standard 300 ml glass BOD bottles. BOD_5 analysis will be from water samples collected in 500ml polyethylene bottles, stored on ice and taken to the laboratory for analysis. Initial D.O. will be measured within 24 hours. Final D.O. will be measured after 5 days of incubation at $20^{B}C$. Measurement of BOD is the responsibility of the facility.

6. **ICP Analysis:** Water samples will be collected from the effluent pipe and surface water in the treatment and control area for ICP and IC analysis. The following will be measured: Mg, Pb, Zn, and Cr. The results of the ICP and IC analysis will be used in reporting the metals and nutrient parameters.

7. **Coliform Analysis:** Fecal coliform (i.e. *Escherichia coli*) will be tested using membrane filtration as a field preparation, and then sent to an EPA certified laboratory for analysis. Ten ml of sample water will be passed through a 0.45 micron filter. The filter will be stored in a sterile petri dish and brought within 8 hrs to a certified laboratory for analysis.

8. **Statistical Analysis:** One-way analysis of variance analysis will be carried out to compare treatment and control area parameters using statistical software. An alpha probability level of <0.05 will be used to define a significant difference. Comparisons of means with significant ANOVA tests will be made using Tukey-Kramer Honestly Significant Difference (HSD) test (Sall and Lehman 1996). Other statistical tests may be used as appropriate.

SOILS

1. **Sediment Cores:** At least one sediment core will be taken from each study site (Treatment & Control) with a 7.5 cm stainless steel corer. Following the removal of large litter debris, the top 10 to 20 cm of the samples will be separated by horizon, dried, ground and analyzed. Parameters measured will include: pH, electrical conductivity (EC), Mg, Pb, Cd, Cr, Cu, Zn, Fe, Ni, Ag, Se, NH_3-N, NO_2+NO_3-N, PO_4-P, TKN, and TP. All elemental analyses will be done using an inductively coupled argon plasma quantometer (ICP). Results will be reported as the average of duplicate analyses that are within a 10% confidence interval. The results will be based on oven dry weight.

2. **Accretion Rate:** Feldspar markers will be laid on the wetland surface at three plots in both the Treatment and Control areas, with each plot having three 0.25 m2 subplots where 1 cm thick powdered feldspar clay will be placed (Cahoon and Turner 1989). The subplots will be marked at each corner with PVC poles. Every four years, the thickness of material deposited on top of the feldspar marker at one subplot of each plot will be measured destructively by taking a 20 cm x 20 cm plug using a shovel or trowel, cleanly slicing the core into several sections to reveal the horizon, then measuring the thickness of material above the surface of the horizon at 10 different locations. The rate of vertical accretion will be calculated by dividing the mean thickness of material above the surface of the horizon by the amount of time the horizon had been in place.

VEGETATION

To sample forest vegetation, three or more subplots should be established at each main plot. Normally, main plots will be established at a near, mid, and outlet locations in the Assimilation site, and another main plot established at a Control site. Each plot will be orientated perpendicular to the hydrological gradient. All trees >10 cm in diameter at breast height (dbh) within each plot will be tagged with an identification number.

1. **Tree Species Composition:** The relative importance of each major tree species in both the Assimilation and Control areas will be based on the density (total number), dominance (basal area), and frequency of occurrence in each of the plots using equations 1-4 (Barbour et al. 1987).

Relative density = (individuals of a species)/(total individuals of all species) (1)
Relative dominance = (total basal area of a species)/(total basal area of all species) (2)
Relative frequency = (frequency of species)/(total frequency of all species in area) (3)
Importance Value = Relative density + Relative dominance + Relative Frequency (4)

2. **Above Ground Biomass:** Biomass production of a forested wetland is defined as the sum of the leaf and fruit fall (ephemeral productivity) and aboveground wood production (perennial productivity, Newbould 1967).

   A. **Ephemeral or Litter Fall Productivity:** To estimate ephemeral productivity, litter fall should be collected using 0.25 m^2 boxes with 1 mm mesh bottoms. At least 2 leaf litter boxes should be installed in each subplot (a minimum of 6 boxes at each main plot). The boxes will be placed randomly in each plot. The baskets will be elevated to prevent inundation during high water periods. Litter fall should be collected bimonthly or monthly depending on the season (litter fall is highest during Fall and Winter). We use the term 'leaf litter' in reference to all non-woody litter including flowers, fruits, and seeds that typically account for <10% of the non-woody litter fall total (Megonigal and Day 1988).

Leaf litter will be separated from woody litter, dried to constant mass at 65°C, and weighed. Leaf litter weights throughout any given year will be summed and extrapolated to g $m^{-2}yr^{-1}$ units.

B. **Perennial Productivity:** Stem biomass will be estimated from annual changes in wood biomass calculated using allometric equations based on stem diameter at breast height (dbh ~ 0.3m) as the independent variable (Table 1). The diameter at breast height (dbh) of all tagged trees will be measured above and below (~5 cm) the identification tag during the winter dormant period. This method allows measurement a safe distance from the tag's nail, which often caused the trunk to swell. Diameter will be measured above the butt swell on large cypress trees. Woody production will be calculated using regression equations (Scott et al. 1985; megonigal et al. 1997, Table 1) based on the diameter for each species as the independent variable. We assume that the contribution of wood and stems <10 cm dbh and herbs will be a relatively small fraction of above-ground net primary production (megonigal et al. 1997). The change in biomass from one winter's measurement to the next represents woody production for the year and will be extrapolated to g $m^{-2}yr^{-1}$ units.

C. **Net Primary Production:** Aboveground net primary production (NPP) will be calculated as the sum of leaf litter and wood protection, and will be given in g $m^{-2}yr^{-1}$ units.

Table 1. Regression equations used to convert diameter at breast height (DBH) measurements to overall perennial biomass. All equations are in the form: Biomass = f (DBH), where biomass is in kg, DBH is in cm and f is the parameterized function.

Species	Biomass f(D) Reference	DBH Range
Fraxinus	Biomass (kg) = ((2.669*((DBHcm*0.394)^1.16332))*0.454	>10 cm
spp.	Megonigal et al. '97 Biomass (kg) = 10^(-.97+2.34*LOG10(DBHcm))	
Taxodium	>10 cm Megonigal et al. '97	
	Biomass (kg) = 10^(-919+2.291*LOG10(DBHcm))	>10 cm
distichum	Megonigal et al. '97	
Nyssa	Biomass (kg) = ((2.39959*((DBHcm*0.394)^2)^1.2003))*0.454	10-28 cm
	Megonigal et al. '97	
aquatica	Biomass (kg) = ((3.15067*((DBHcm*0.394)^2)^1.21955))*0.45	10-28 cm
Acer	Megonigal et al. '97	
rubrum	Biomass (kg) = ((5.99898*((DBHcm*0.394)^2)^1.08527))*0.45	>28 cm
Quercus	Megonigal et al. '97	
nigra	Biomass (kg) = 10^(-1.5+2.78*LOG10(DBHcm))	n.a.
	Scott et al. 1985	
Salix spp.	Biomass (kg) = ((2.54671*((DBHcm*0.394)^2)^1.20138))*0.45	10-28 cm
	Megonigal et al. '97	
Other	Biomass (kg) = ((1.80526*((DBHcm*0.394)^2)^1.27313))*0.45	>28 cm
Species	Megonigal et al. '97	

3. **Understory Vegetation:** Shrubs, saplings (individuals <10cm dbh but >2.5 cm dbh), and seedlings (individuals <2.5 cm dbh) will be tabulated by species in a 5m X 5m plot established in each subplot. From the data, density and basal area will be calculated for trees and density will be calculated for sapling and seedling species.

The present cover for herbaceous vegetation will be determined by a modified line-intercept technique patterned after that proposed by DS&N, Inc. (1988). The method consists of observations made of plant species occurring along a 1m X 10m transect located at the eastern edge of each plot. Each 10m section is divided into

1m X 1m intervals. Species cover will be determined on the basis of the percent cover occupied within each 1m X 10m unit. Herbaceous plots will be measured at least once during the study.

4. **Nutrient and Metals Analysis of Green Leaves:** Green leaf samples should be collected during the last year of the monitoring from the major species in the treatment and control areas, once during March through May and once during September through November. Samples will be oven-dried at 70^{B}C for at least 48 hours, ground in a Wiley mill to pass a 40 mesh screen, and stored in whirl-pak bags. Samples will be analyzed in the laboratory for Mg, Pb, Cd, Cr, Cu, Zn, Fe, Ni, Ag, Se, TKN and TP. The tissue analyses should be done by a wet digestion method.

5. **Marsh Vegetation Production:** Net production in areas dominated by non-woody herbaceous vegetation will be determined by end of season live (EOSL) biomass analysis. Sampling should be conducted during the last week of September or the first week of October. At least five 0.06 m^2 clip plots will be taken at each location using randomly placed quadrants. Vegetation within the quadrant will be cut as close to the surface as possible, stored in labeled paper bags, brought back to the laboratory, and refrigerated until processing. Live material will be separated from dead, and dried at 60^{B} C to a constant weight. All data will be presented on a live dry weight per square meter basis (g dry wt m^{-2}).

X. PREVIOUS PERMITS:

LPDES Permit No. LA0032131: Issued: October 1, 2004
Expires: upon permit reissuance

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Monthly Avg.	Weekly Max.	Measurement Frequency	Sample Type
Flow	Report	Report	Continuous	Recorder
BOD_5	10 mg/l	15 mg/l	2/week	6 hr. composite
TSS	15 mg/l	23 mg/l	2/week	6 hr. composite
TKN	---	report	2/week	6 hr. composite
TRC	none allowable		2/week	Grab
Ammonia-Nitrogen	report	report	2/week	Grab
Fecal Coliform Colonies	200	400	2/week	Grab
pH	6 min. – 9 max.			

The permit contains biomonitoring.
The permit contains pollution prevention language.

XI. ENFORCEMENT AND SURVEILLANCE ACTIONS:

A) Inspections

A review of the files indicates the following most recent inspection was performed:

Date – March 2, 2005
Inspector - LDEQ
Findings and/or Violations -

1. A DMR review noted several permit limit excursions.
2. The facility reported bypass and overflow during November 2004 and February 2005.
3. The discharge had a green tint.
4. The facility performs pH and TRC testing on site. Some entries did not have time of calibration.

B) Compliance and/or Administrative Orders

This facility is currently under Administrative Order CWA-06-2006-1822 which specifies interim limits for discharge to the Luling Wetland.

C) DMR Review

A review of the discharge monitoring reports for the period beginning December 1, 2004 through April 30, 2006 has revealed the following violations:

Month	Parameter	Permit Limit	DMR Reported Value
February 2005	BOD_5, Monthly Avg.	10 mg/l	12 mg/l
	BOD_5, Weekly Avg.	15 mg/l	20 mg/l
	BOD_5 (mass), Monthly Avg.	216 lb/day	239 lb/day
May 2005	BOD_5, Monthly Avg.	10 mg/l	11 mg/l
	BOD_5, Weekly Avg.	15 mg/l	16 mg/l
June 2005	BOD_5, Monthly Avg.	10 mg/l	20 mg/l
	BOD_5, Weekly Avg.	15 mg/l	28 mg/l
July 2005	BOD_5, Monthly Avg.	10 mg/l	16 mg/l
	BOD_5, Weekly Avg.	15 mg/l	21 mg/l
	BOD_5 (mass), Monthly Avg.	216 lb/day	275 lb/day
August 2005	BOD_5, Monthly Avg.	10 mg/l	13 mg/l
	BOD_5, Weekly Avg.	15 mg/l	18 mg/l
September 2005	BOD_5, Monthly Avg.	10 mg/l	20 mg/l
	BOD_5, Weekly Avg.	15 mg/l	32 mg/l
	BOD_5 (mass), Monthly Avg.	216 lb/day	399 lb/day
	TSS, Monthly Avg.	15 mg/l	16.5 mg/l
	TSS(mass), Monthly Avg.	325 lb/day	369 lb/day
October 2005	BOD_5, Monthly Avg.	10 mg/l	26 mg/l
	BOD_5, Weekly Avg.	15 mg/l	33 mg/l
	TSS, Monthly Avg.	15 mg/l	21 mg/l
	TSS, Weekly Avg.	23 mg/l	25 mg/l

December 2005	BOD_5, Monthly Avg.	10 mg/l	24 mg/l
	BOD_5, Weekly Avg.	15 mg/l	31 mg/l
	BOD_5 (mass), Monthly Avg.	216 lb/day	232 lb/day
	TSS, Monthly Avg.	15 mg/l	30 mg/l
	TSS, Weekly Avg.	23 mg/l	40 mg/l
January 2006	BOD_5, Monthly Avg.	10 mg/l	18 mg/l
	BOD_5, Weekly Avg.	15 mg/l	21 mg/l
	TSS, Monthly Avg.	15 mg/l	26 mg/l
	TSS, Weekly Avg.	23 mg/l	37 mg/l
February 2006	BOD_5, Monthly Avg.	10 mg/l	17 mg/l
	BOD_5, Weekly Avg.	15 mg/l	29 mg/l
	TSS, Monthly Avg.	15 mg/l	31 mg/l
	TSS, Weekly Avg.	23 mg/l	90 mg/l
	TSS (mass), Monthly Avg.	325 lb/day	377 lb/day
March 2006	BOD_5, Monthly Avg.	10 mg/l	19 mg/l
	BOD_5, Weekly Avg.	15 mg/l	24 mg/l
	TSS, Monthly Avg.	15 mg/l	38 mg/l
	TSS, Weekly Avg.	23 mg/l	70 mg/l
	TSS (mass), Monthly Avg.	325 lb/day	337 lb/day
April 2006	BOD_5, Monthly Avg.	10 mg/l	23 mg/l
	BOD_5, Weekly Avg.	15 mg/l	27 mg/l
	TSS, Monthly Avg.	15 mg/l	43 mg/l
	TSS, Weekly Avg.	23 mg/l	60 mg/l

XII. ADDITIONAL INFORMATION:

The Department of Environmental Quality reserves the right to impose more stringent discharge limitations and/or additional restrictions in the future to maintain the water quality integrity and the designated uses of the receiving water bodies based upon water quality studies. These studies may indicate the need for advanced wastewater treatment. Studies of similar dischargers and receiving water bodies have resulted in monthly average effluent limitations of 5 mg/l $CBOD_5$, and 2 mg/l NH_3-N. Therefore, prior to upgrading or expanding this facility, the permittee should contact the Department to determine the status of the work being done to establish future effluent limitations and additional permit conditions.

A review of the priority pollutant analysis received by the Department on November 16, 2004 indicates that the effluent contains three (3) priority pollutants above the MQL. Arsenic, Selenium, and Total Phenols were screened as shown in Appendix 1, which showed that permit limits are not required for these pollutants.

Final effluent loadings (i.e. lbs/day) have been established based upon the permit limit concentrations and the design capacity of 3.2 MGD.

Effluent loadings are calculated using the following example:
BOD: 8.34 gal/lb x 3.2 MGD x 30 mg/l = 801 lb/day

The **Monitoring Requirements, Sample Types, and Frequency of Sampling** as shown in the permit are as follows:

Effluent Characteristics	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow	Continuous	Recorder
BOD_5	1/week	6 Hr. Composite
Total Suspended Solids	1/week	6 Hr. Composite
Total Nitrogen	quarterly	6 Hr. Composite
Total Phosphorus	quarterly	6 Hr. Composite
Fecal Coliform Bacteria	1/week	Grab
pH	1/week	Grab
Biomonitoring		
Ceriodaphnia dubia	2/year	24 Hr. Composite
Pimephales promelas	2/year	24 Hr. Composite

Pretreatment Requirements

Based upon consultation with LDEQ pretreatment personnel, general pretreatment language will be used due to the lack of either an approved or required pretreatment program.

Environmental Impact Questionnaire:

Applicant Comments/Responses (verbatim from applicant)

1. Have the potential and real adverse effects of the proposed facility been avoided to the maximum extent possible?

   There will be no harmful effects on the environment. The effluent discharged into the Luling wetlands will be helpful to promote new growth and enhance productivity. The plants will utilize all nutrients from the effluent. Accretion will be enhanced. These positive impacts are documented in the UAA.

2. Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?

   There will be no detrimental impact on the environment. There will be a considerable economic cost savings. Therefore, social, economical, and environmental benefits far outweigh cost, as documented in the UAA.

3. Are there alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits?

   All other alternatives, for example, transferring all flows from Luling Oxidation Pond to Hahnville Wastewater Treatment Plant would be much more costly ($11 million vs. $ 40 thousand) and not achieve the same benefit.

4. Are there alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits?

   No, this site is ideally located near wetlands that can chemically, physically, and biologically remove pollutants, sediments, and nutrients from the water flowing through them. See UAA.

5. Are there mitigating measures which would offer more protection to the environment than the facility as proposed without unduly curtailing non-environmental benefits?

   Mitigation measures are not necessary since the project will enhance the environment. See UAA.

XIII TENTATIVE DETERMINATION:

On the basis of preliminary staff review, the Department of Environmental Quality has made a tentative determination to revoke and reissue a permit for the discharge described in this Fact Sheet

XIV REFERENCES:

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